

**Gas Pipeline Corridor Geologic Hazards and Resources -
Phase 2**

FY2008 Request: \$600,000
Reference No: AMD41415

AP/AL: Appropriation

Project Type: Planning

Category: Development

Location: Statewide

Contact: Nico Bus

House District: Statewide

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Estimated Project Dates: 07/01/2007 - 06/30/2008

Brief Summary and Statement of Need:

This is the continuation of a project to assess the geologic hazards and resource potential along the proposed natural gas pipeline corridor from Delta Junction to the Canadian border. In the first phase, DGGS conducted airborne geophysical surveys of the corridor to identify major geologic features and structures. The next phase will incorporate the geophysical data in high resolution geologic mapping for hazard assessment, construction materials identification, and resource evaluation. The resulting maps and reports will provide data for; 1) design and construction of the pipeline, 2) characterization of available construction materials, and 3) future developments such as the proposed Alaska Railroad extension.

Funding:	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	Total
Gen Fund	\$600,000	\$850,000	\$600,000	\$600,000			\$2,650,000
Total:	\$600,000	\$850,000	\$600,000	\$600,000	\$0	\$0	\$2,650,000

<input type="checkbox"/> State Match Required	<input type="checkbox"/> One-Time Project	<input type="checkbox"/> Phased - new	<input checked="" type="checkbox"/> Phased - underway	<input type="checkbox"/> On-Going
0% = Minimum State Match % Required		<input checked="" type="checkbox"/> Amendment	<input type="checkbox"/> Mental Health Bill	

Operating & Maintenance Costs:

	<u>Amount</u>	<u>Staff</u>
Project Development:	0	0
Ongoing Operating:	0	0
One-Time Startup:	0	0
Totals:	0	0

Additional Information / Prior Funding History:

SLA06/CH82 - \$265,000

FSSLA2005,CH3 - \$2,000,000

Project Description/Justification:

Because transportation corridors are the economic lifeline of the state, it is of primary importance that the Division of Geological and Geophysical Surveys (DGGS) provide fundamental data regarding aspects of geology that could impact existing and proposed infrastructure. Detailed geologic maps, including bedrock geology and surficial geologic deposits, lay the groundwork necessary for evaluating geohazards, such as potentially active faults, slope instability, and permafrost, and for targeting areas most suitable for new construction-materials sites. It is estimated that over 6 million cubic yards of gravel will be required to build the pipeline alone, and it is not clear where that material will be available. Prospective development along the Alaska Highway, with proposed construction of a natural gas pipeline and discussion of extending the Alaska Railroad into Canada, makes this corridor one with a compelling need for detailed geologic evaluation.

Despite its importance, the Alaska Highway corridor southeast of Delta Junction has little publicly available data on the potential geologic hazards that could adversely affect the safe construction and operation of a gas pipeline, railroad, and other critical developments. Such hazards include active faults, landslides, debris flows, earthquake-induced liquefaction, permafrost, erosion, and flooding, among others. The corridor north of Delta Junction has been much more extensively studied, primarily for construction of TAPS, although most of these data are not available digitally. Some detailed engineering studies were conducted by the private sector between Delta Junction and Canada during the late 1970s, but these studies

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were for a narrow corridor only 2½ miles wide, did not have the benefit of detailed geophysical mapping techniques or remote-sensing imagery available today, are not publicly available, and are not in GIS format.

With FY2005 supplemental funding, the Division of Geological & Geophysical Surveys (DGGS) initiated geologic hazards and resources evaluations along this route by conducting airborne geophysical surveys of a 16-mile-wide corridor between Delta Junction and the Canadian border. This geophysical survey serves as a starting point for the proposed ground-based 1:63,360-scale geologic mapping. The mapping will provide the basis for evaluation of geologic hazard risks to construction and operation of the pipeline and railroad, materials sources that will aid in their construction, and potential mineral resources that may provide additional economic benefit through use of the corridor to gain access to markets. In addition to the Pogo deposit, other mineralized areas are known along the route, including the Goodpaster and Delta River districts.

Existing geologic map coverage along this corridor is discontinuous, at different scales, and inconsistent in terminology, approach, and content. This project will make use of existing data in planning and analysis, but will combine all viable existing data with new data in a single, seamless GIS database using state-of-the-art methodology and standardized terminology. Planners and designers will be able to layer the resulting GIS maps of geology, geophysics, hazards, and resources with proposed alignments of the gas pipeline, railroad extension, and other infrastructure to facilitate efficient engineering, construction, and risk management.

At DGGS's recommendation in 2000, in anticipation of the proposed natural gas pipeline and railroad extension, NASA flew airborne Synthetic Aperture Radar imaging surveys along the entire corridor between Fairbanks and the Canadian border. These surveys produced digital elevation data for the corridor at 5-meter resolution. These data, together with airborne geophysics and new high-resolution orthorectified satellite panchromatic and thematic imagery, provide new tools for detailed geologic mapping and terrain analysis that will be used to the greatest extent possible in conducting this project and generating products. These tools were not available to the engineers and scientists who surveyed this route in the 1970s and 1980s.

Staffing of this project will include a DGGS project manager (funded separately), two or more additional existing DGGS geologists (part time), and a student intern. The project will make extensive use of contract geologists from the private sector, University of Alaska faculty from the Department of Geology and Geophysics, and Department of Mining and Geological Engineering.

Products of this project will be peer-reviewed, published geologic reports, maps, and GIS data for a 12-mile-wide corridor, depicting detailed bedrock and surficial geology, potential geologic hazards, and areas suitable for construction materials resources. All map data will be made available in digital GIS formats in conformance with national standards.

The proposed cost and duration of this project are based on our historic costs of field-geologic mapping projects. The area to be mapped is approximately 2,400 square miles, or the equivalent of about ten standard 1:63,360-scale quadrangles. Our average cost of generating a single comprehensive (bedrock and surficial) geologic quadrangle map in a year is about \$350,000. The cost of producing the equivalent of two adjacent maps in one year is approximately \$600,000. Our proposed long-term budget is based on mapping about 800 square miles of the area in FY2007, taking advantage of existing detailed geologic maps. FY2008 funding will map the equivalent of two quadrangles. Mapping the equivalent of two quadrangles each in FY2009 and FY2010, and the remaining mapping, final analyses, and report writing in FY2011 are projected to complete the project.

Why is this Project Needed Now?

With the State of Alaska actively advocating construction of a natural gas pipeline, the timing was ideal to begin this hazards and resource assessment project in 2005 with FY2005 supplemental funds. The corridor hazards and resources project will allow ground-based geologic mapping to utilize the published airborne geophysical data. The resulting detailed maps and reports of potential geohazards and resources along the corridor between Delta Junction and Canada will aid pipeline designers, contractors, and regulators who can use the data to guide pipeline design and on-site modification planning, locate prospective sources for construction materials, and guide site-specific hazards and engineering studies. Consequently, potential risks can be identified prior to construction, problems can be avoided, delays will be reduced, and future operation will be safer. The same kind of geologic analysis and resultant engineering that prevented catastrophic failure of the TAPS during the 2002 Denali fault earthquake will help prevent future interruption of service of the natural gas pipeline.

Specific Spending Detail:

100 Personal Services	\$210,000
200 Travel	\$20,000

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300 Contractual Services	\$360,000
400 Supplies	\$10,000
Total	\$600,000

Project Support:

Pipeline companies, oil & gas industry, engineering community, geological consulting community, sand and gravel companies, Department of Transportation & Public Facilities, State Pipeline Coordinator's Office, Alaska Railroad, University of Alaska, Alaska Miners Association, local communities, and Native corporations in the project area.

Prior Funding History and Status:

An FY2005 Supplemental budget request, \$2,000,000 (SLA 05/CH 3), funded an airborne geophysical survey of a 16-mile-wide corridor centered on the proposed gas pipeline centerline from Delta Junction to the Canadian Border. The survey was conducted in winter 2005-06; the geophysical data were released in May 2006. Remaining FY2005 funds and FY2007 CIP funding of \$300,000 is supporting the first segment of geologic mapping, hazard assessment and resource evaluation, from Delta Junction to Dot Lake. Reconnaissance field investigations were conducted in August 2006. Work continues on data compilation and interpretation this winter, with the second field season of geologic work in this segment planned for summer 2007. Final reports and maps for the initial segment are scheduled for late spring 2008. The requested funding will allow continuation of the geologic mapping, hazard assessment and resource evaluation further southeast along the Alaska Highway corridor from Dot Lake toward Tok, including portions of the Tanacross C-6 and B-6 quadrangles.